

UTAH ALIGNMENT FOR NIH SUPPLEMENT DOING SCIENCE: THE PROCESS OF SCIENTIFIC INQUIRY

<b>DOING SCIENCE: THE PROCESS OF SCIENTIFIC INQUIRY</b>		
<b>Utah Science Intended Learning Outcomes: Grades 7 &amp; 8</b>		
<b>Lesson</b>	<b>ILO</b>	<b>Descriptor</b>
1, 3, 4	1.a	Observe objects and events for patterns and record both qualitative and quantitative information.
3, 4	1.b	Sort and sequence data according to a given criterion.
3	1.c	Develop and use categories to classify subjects studied.
1	1.d	Select the appropriate instrument; measure, calculate, and record in metric units, length, volume, temperature and mass, to the accuracy of instruments used.
All lessons	1.e	When given a problem, plan and conduct experiments in which they: Form research questions, discuss possible outcomes of investigations, identify variables, plan procedures to control independent variable(s), collect data on the dependent variable(s), select appropriate format (e.g., graph, chart, diagram) to summarize data obtained, analyze data and construct reasonable conclusions, and prepare written and oral reports of their investigation.
All lessons	1.f	Distinguish between factual statements and inferences.
All lessons	2.b	Raise questions about objects, events and processes that can be answered through scientific investigation.
All lessons	2.c	Maintain an open and questioning mind toward ideas and alternative points of view.
All lessons	2.d	Check reports of observations for accuracy.
	2.e	Accept and use scientific evidence to help resolve ecological problems.
All lessons	3.a	Know and explain science information specified for their grade level.
All lessons	3.c	Compare concepts and principles based upon scientific criteria.
All lessons	3.d	Solve problems appropriate to grade level by applying science principles and procedures.
All lessons	4.a	Provide relevant data to support their inferences and conclusions.
All lessons	4.b	Use precise scientific language in oral and written communication.
All lessons	4.c	Use correct English in oral and written reports.
All lessons	4.e	Use mathematical language and reasoning to communicate information.
1	4.f	Construct models to describe concepts and principles.
3, 4	5.a	Cite examples of how science affects life.
1, 3, 4	5.c	Understand the cumulative nature of the development of science knowledge.
All lessons	6.a	Science is a way of knowing that is used by many people, not just scientists.
All lessons	6.b	Understand that science investigations use a variety of methods and do not always use the same set of procedures; understand that there is not just one "scientific method."
All lessons	6.c	Science findings are based upon evidence.

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<b>All lessons</b>	<b>6.d</b>	Understand that science conclusions are tentative and therefore never final. Understandings based upon these conclusions are subject to revision in light of new evidence.
<b>All lessons</b>	<b>6.e</b>	Understand that scientific conclusions are based on the assumption that natural laws operate today as they did in the past and that they will continue to do so in the future.
<b>All lessons</b>	<b>6.f</b>	Understand that various disciplines of science are interrelated and share common rules of evidence to explain phenomena in the natural world.
<b>Utah Mathematics Core Curriculum Standards: Math 7, Pre-Algebra, and Algebra I</b>		
<b>Math 7</b>		
<b>Lesson</b>	<b>Standard</b>	<b>Objective</b>
<b>3, 4</b>	<b>1:1.a</b>	Demonstrate multiple ways to represent whole numbers, decimals, fractions, percents, and integers using models and real-life examples.
<b>3, 4</b>	<b>1:5.a</b>	Compute fluently using all four operations with integers and positive fractions and decimals.
<b>3, 4</b>	<b>1:5.c</b>	Solve application problems involving rational numbers.
<b>3, 4</b>	<b>1:5.d</b>	Determine if an answer is reasonable using estimation.
<b>3</b>	<b>3:2.c</b>	Model real-world problems using graphs, tables, equations, manipulatives, and pictures.
<b>1</b>	<b>4:2.b</b>	Measure length, area, volume, and angles to appropriate levels of precision.
<b>3</b>	<b>5:2.a</b>	Display data using tables, scatter plots, and circle graphs.
<b>3</b>	<b>5:2.b</b>	Compare two similar sets of data on the same graph.
<b>3, 4</b>	<b>5:2.d</b>	Propose and justify inferences and predictions based on data.
<b>Pre-Algebra</b>		
<b>3, 4</b>	<b>1:1.a</b>	Compute fluently using all four operations with integers, and explain why the corresponding algorithms work.
<b>3, 4</b>	<b>1:3.c</b>	Solve problems involving rational numbers, percents, and proportions.
<b>3, 4</b>	<b>3:3.e</b>	Model real-world problems using graphs, tables, equations, manipulatives, and pictures, and identify extraneous information.
<b>2, 3, 4</b>	<b>5:2.a</b>	Formulate questions that can be answered through data collection and analysis.
<b>3, 4</b>	<b>5:2.e</b>	Use graphical representations and numerical summaries to answer questions and interpret data.
<b>Algebra I</b>		
<b>3, 4</b>	<b>1:2.c</b>	Compute solutions to problems, represent answers in exact form, and determine the reasonableness of answers.
<b>3, 4</b>	<b>4:1.a</b>	Collect, record, organize, and display a set of data with at least two variables.

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Utah Mathematics Intended Learning Outcomes: Grades 7 & 8		
Lesson	ILO	Descriptor
2, 3, 4	2	Become proficient problem-solvers by posing appropriate questions, selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches.
3, 4	3	Think logically, using inductive reasoning to formulate reasonable conjectures and using deductive reasoning for justification, formally and informally.
3, 4	4	Cooperatively and independently explore mathematics, using inquiry and technological skills.
3, 4	5	Make connections between mathematical ideas, between mathematics and other disciplines, and to life.
3, 4	6	Communicate mathematics through verbal, written, and visual representations, using precise mathematical language and symbolic notation.

Utah Language Arts Core Curriculum Standards: Grades 7 & 8		
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Grade 7		
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Lesson	Standard	Objective
All lessons	1:1.c	Determine word meaning through definition or explanation context clues.
All lessons	1:2.c	Retell, paraphrase and summarize from informational text.
All lessons	1:2.d	Distinguish main idea and supporting details in text.
All lessons	2:1.a	Retell significant events in sequence.
All lessons	2:1.b	Summarize essential information from literary or informational text.
All lessons	2:1.c	Connect text to self.
All lessons	3:1.a	Establish a purpose for inquiry.
All lessons	3:1.b	Gather relevant information to answer questions.
All lessons	3:1.c	Validate the accuracy and relevance of information, discriminating between fact and opinion.
All lessons	3:2.a	Select an appropriate format to report information.
All lessons	3:2.b	Gather information on an idea or concept.
All lessons	3:2.c	Report information using summarization.
All lessons	3:3.a	Determine the purpose for communication (e.g., to respond to writing, to obtain a result, to convey ideas or information, to seek validation).
All lessons	3:3.b	Use appropriate protocol for asking questions (e.g., turn taking, staying on topic, projecting adequately).
All lessons	3:3.c	Use appropriate protocol for responding to questions (e.g., respecting others' contributions, staying on topic, projecting adequately).

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All lessons	3:3.d	Contribute constructively in classroom settings.
<b>Grade 8</b>		
All lessons	1:1.c	Determine word meaning through definition or explanation context clues.
All lessons	1:2.c	Infer meaning from explicit information in text.
All lessons	1:2.d	Distinguish fact from opinion.
All lessons	2:1.a	Organize events and ideas in order of importance.
All lessons	2:1.b	Focus written facts or events around a clearly stated, unifying idea.
All lessons	2:1.c	Connect text to self, text to world and text to text.
All lessons	3:1.a	Formulate text-supported, open-ended questions for inquiry (i.e., literal, interpretive inferential, evaluative).
All lessons	3:1.b	Choose information that best supports the focus of inquiry.
All lessons	3:1.c	Distinguish between reliable and unreliable sources of information.
All lessons	3:2.a	Select an appropriate format to demonstrate understanding.
All lessons	3:2.c	Report information by paraphrasing, summarizing, and/or quoting from sources.
All lessons	3:3.a	Determine the purpose for small group learning activities (e.g., to respond to writing, to acquire information, to present ideas, to clarify understanding).
All lessons	3:3.b	Identify and assume responsibility for specific group tasks, including asking relevant questions.
All lessons	3:3.c	Respond appropriately to group members' questions and contributions.
1, 3, 4	3:3.d	Present group reports.
<b>Utah Language Arts Intended Learning Outcomes: Grades 7 &amp; 8</b>		
Lesson	ILO	Descriptor
All lessons	2.c	Develop thinking and language acquisition together through interactive learning.
All lessons	4.a	Give and seek information in conversations, in group discussions, and in oral presentations.
All lessons	4.b	Use questioning techniques to gain information.
All lessons	4.c	Participate in and report on small group learning activities.
All lessons	5.b	Access background knowledge to prepare to read and enjoy texts.
All lessons	5.c	Use meta-cognition strategies during reading to monitor comprehension.
All lessons	5.d	Improve comprehension by using strategies when meaning breaks down.
All lessons	5.e	Retain information from and respond to text after reading.
All lessons	6.e	Develop collaborative writing skills to prepare for workplace writing.
All lessons	6.f	Understand that writing is a tool for thinking: solving problems, exploring issues, constructing questions, addressing

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		inquiry.
<b>All lessons</b>	<b>6.g</b>	Understand that reading and writing are interrelated: writers approach new reading experiences with enhanced appreciation for the text.
<b>Utah Health Education Core Curriculum Standards: Grades 7 &amp; 8</b>		
<b>4</b>	<b>4:1.b</b>	Identify methods of prevention for communicable diseases; e.g., hand washing, personal hygiene, immunization, balanced diet, exercise, rest, abstinence from high-risk behaviors.
<b>3, 4</b>	<b>4:1.d</b>	Summarize ways in which many diseases are treatable and manageable; e.g., proper use of medication, appropriate check-ups, diet, humor, and exercise.
<b>3</b>	<b>7:1.a</b>	Identify a variety of information sources; e.g., Internet, infomercials, pamphlets, public health department, television, telephone book, clinics.